

Claims

What is claimed is:

1. A packaged integrated circuit comprising:
a die;
5 a package body formed from encapsulant, at least partially enclosing the die;
a leadframe connected to the die and at least partially enclosed within the package body, and
having leads extending from the package body, a subset of the leads of the leadframe being separated
by a lead-to-lead pitch, wherein at least two adjacent leads of the leadframe are separated by a space
larger than the pitch; and
10 at least one additional lead connected to the die and disposed on an underside of the package
body, the at least one additional lead being connectable to a circuit mounting structure trace passing
between the adjacent leads separated by the space larger than the pitch.
2. The packaged integrated circuit of claim 1, wherein the at least one additional lead is wire
bonded to the die within the package body.
- 15 3. The packaged integrated circuit of claim 1, wherein the at least one additional lead is
substantially flush with the underside of the package body.
4. The packaged integrated circuit of claim 1, wherein the at least one additional lead is
disposed adjacent to the die on the underside of the package body.
5. The packaged integrated circuit of claim 1, wherein the at least one additional lead is
20 disposed on a side of the die on the underside of the package body closest to the space larger than
pitch.

6. The packaged integrated circuit of claim 1, wherein at least one additional lead is disposed on each side of the die on the underside of the package body.

7. The packaged integrated circuit of claim 6, wherein a space larger than the pitch is disposed between two adjacent leads on each side of the package body.

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8. The packaged integrated circuit of claim 1, wherein the packaged integrated circuit is configured as a Thin Quad Flat Package (TQFP).

9. The packaged integrated circuit of claim 1, wherein a die pad of the die is exposed on the underside of the packaged integrated circuit.

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10. The packaged integrated circuit of claim 1, wherein the leads in the subset of leads separated by the lead-to-lead pitch of the leadframe are configured for carrying data and control signals.

11. The packaged integrated circuit of claim 1, wherein the at least one additional lead is configured for carrying a signal having a frequency of at least 2 GHz.

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12. The packaged integrated circuit of claim 1, wherein the lead-to-lead pitch is approximately 0.4 mm wide.

13. The packaged integrated circuit of claim 1, wherein each lead of the leadframe is approximately 0.2 mm wide.

14. The packaged integrated circuit of claim 1, wherein the space larger than the pitch is determined by the equation, $LP = wx + p(x+1)$, wherein LP represents the space larger than pitch,

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w represents a width of the leadframe leads, p represents the lead-to-lead pitch, and x represents the number of leadframe leads removed to form the space larger than pitch.

15. The packaged integrated circuit of claim 1, wherein the die comprises an integrated circuit device.

5 16. A leadframe of for use in a packaged integrated circuit, comprising:
a plurality of leads, a subset of the leads being separated by a lead-to-lead pitch, wherein at least two adjacent leads are separated by a space larger than the pitch, allowing a circuit mounting structure trace to pass through the space larger than the pitch when the leadframe is in use in a packaged integrated circuit having a package body which at least partially encloses the leadframe,
10 so that the trace is connectable to an additional lead on an underside of the package body.

17. The leadframe of claim 16, further comprising at least one locking mechanism coupled between the adjacent leads having the space larger than the pitch therebetween, the locking mechanism being configured to maintain the space larger than the pitch.

15 18. The leadframe of claim 17, wherein the locking mechanism is at least partially enclosed within the package body.

19. The leadframe of claim 17, wherein the locking mechanism is U-shaped having a central portion arranged within the package body and first and second legs each extending toward a perimeter of the package body when the leadframe is used in a packaged integrated circuit.

20 20. A circuit mounting structure comprising at least one electrical connector, a plurality of traces, and at least one packaged integrated circuit mounted thereon, the packaged integrated circuit comprising:
a die;

a package body formed from encapsulant, at least partially enclosing the die;

a leadframe connected to the die and at least partially enclosed within the package body, and having leads extending from the package body, a subset of the leads of the leadframe being separated by a lead-to-lead pitch, wherein at least two adjacent leads of the leadframe are separated by a space

5 larger than the pitch; and

at least one additional lead connected to the die and disposed on an underside of the package body, the at least one additional lead being connectable to a trace of the circuit mounting structure routed from the at least one electrical connector and passing between the adjacent leads separated by the space larger than the pitch.